

## Thyroid Pathology

The thyroid gland is located in a fairly accessible and visible part of the body. We will approach thyroid pathology in a systematic fashion, looking at:

### I. Anatomy

- Understanding the anatomical relations helps you to work out the clinical presentations of thyroid enlargement (goitre).

### II. Function

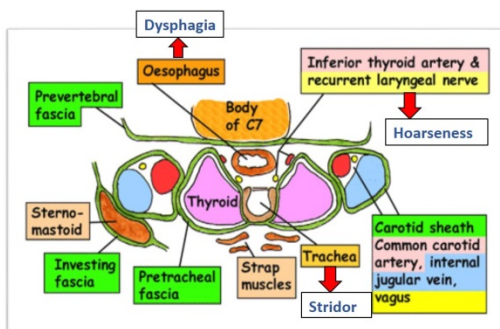
- The function of the thyroid gland relates to the type of parenchymal cells it contains
- It is also important to appreciate that the thyroid gland is an **endocrine** organ, and therefore part of a system of regulatory mechanisms

### III. Clinicopathologic Correlates

- This section helps you correlate the clinical manifestations of thyroid pathology with specific disease entities
- Build on this framework by reading about the specific *pathogenesis, clinical features and morphologic features* of each condition

### Anatomy

The relations of the thyroid gland are particularly important. Think about thyroid enlargement → what gets compressed? This gives rise to the clinical presentation.



<http://khalidalomari.weebly.com/lobes-and-relation.html>

Reference websites for thyroid anatomy:

<http://khalidalomari.weebly.com/lobes-and-relation.html>

### Function

The main functions of the thyroid gland are brought about by the TWO main parenchymal cell types:

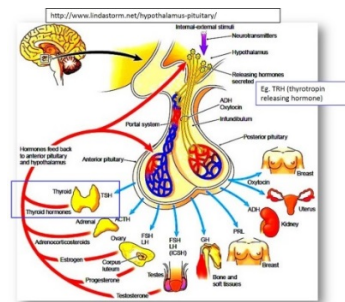
- Follicular cells** → Thyroid hormones T3 (tri-iodothyronine) and T4 (tetra-iodothyronine/thyroxine)
  - Regulate basal metabolic rate (think about the clinical signs and symptoms of *hyper/hypo thyroidism*)
  - Growth and development, especially of the central nervous system (*read about Cretinism – hypothyroidism in infancy or childhood*)
  - The free (unbound) hormones are the metabolically active forms

### 2. Parafollicular C cells → Calcitonin

- Calcium metabolism – maintains calcium homeostasis (generally, calcitonin opposes the effects of Parathormone)

### Regulation of T3 and T4 production

As an endocrine organ, the thyroid gland is subject to secondary (pituitary – TSH) and tertiary (hypothalamus – TRH) control mechanisms that all endocrine organs are subject to. This is the **hypothalamo-pituitary axis**.



Mindmap - Thyroid anatomy and function:

<https://medicine.nus.edu.sg/pathweb/pathology-demystified/thyroid-pathology/thyroid-ii-function/>

### Clinicopathologic Correlates

Here are TWO main clinical manifestations of thyroid disease:

#### 1. Enlargement (non-neoplastic or neoplastic)

- Determined by history, clinical examination and imaging

#### 2. Abnormal function (hyper or hypothyroidism)

- Assessed by blood investigations of various hormone levels (free T3 Free T4, TSH)

Remember, these two can co-exist (e.g. Graves disease – think about what the clinical presentation is).

- The **Aetiology** of thyroid conditions is widely variable, but the few that are more common and important are as featured in your lecture notes:

- Congenital** conditions (e.g. hypoplasia, ectopic thyroid)
- Hyperplasia** (simple or nodular hyperplasia due to decreased iodine availability)
- Immune related** (autoimmune, or other mechanisms of thyroiditis)
- Neoplasms**

In clinicopathologic correlation, we would ask some questions. E.g. What condition is more likely to cause diffuse enlargement? Which causes a solitary nodule?

Mindmap - Clinicopathologic correlation:

<https://medicine.nus.edu.sg/pathweb/pathology-demystified/thyroid-pathology/thyroid-iii-clinicopathologic-correlates/>

### Talking POTS and slides

<https://medicine.nus.edu.sg/pathweb/pathology-demystified/thyroid-pathology/thyroid-talking-pots-and-slides/>

### Quiz

<https://medicine.nus.edu.sg/pathweb/pathology-demystified/thyroid-pathology/thyroid-quiz/>